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(54) **MACHINE FOR WRAPPING LOLLIPOPS**

(57) The lollipop wrapping machine comprises a lollipop fine positioning systems (1) using a pusher; a system (2) for unwinding, cutting and supplying wrappers, said system having mechanisms and means for moving and cutting the wrappers; another system (3) for the supply of wrappers, using a ionised air curtain, a wrap-

per sealing system (4) using hot air; means (5) for controlling the hot air pressure and for deflecting discarded wrappers; a system (6) for rejecting lollipops with defective wrappings and a system (7) for changing automatically the bobbins.

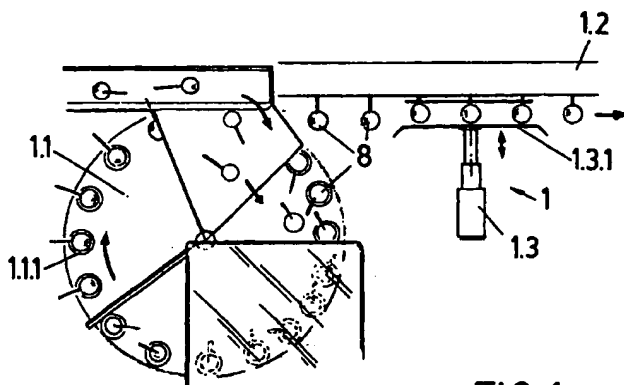


FIG. 1

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Description

OBJECT OF THE INVENTION

[0001] The invention here disclosed relates to a lollipop wrapping machine, from among those machines provided with means of aligning the lollipops and applying and sealing the wrappers.

[0002] The invention is characterised in that it incorporates a number of novel devices, such as among others a lollipop positioning system, a wrapper unwinding, cutting and supply system, another system for the supply of wrappers, a system for sealing these using hot air and another system for rejecting lollipops with defective wrappings.

BACKGROUND OF THE INVENTION

[0003] Conventional lollipop wrapping machines are provided with cams and discontinuous transport means, also characterised by their high static charge and a low top dragging speed and thermal adhesion of the wrapper to itself and to the lollipop stick.

[0004] The high static charge of the wrapper parts obtained from the plastic film reel is conditioned by the high electrical charge generated by the frequent and sudden starts and stops of the wrapper unwinding and cutting system.

[0005] This fact is associated to a practical distancing of the supply rollers and cutting blades, and eventually, a limit which is hard to exceed for production on the order of 280 units per minute.

[0006] This limit production is also conditioned by the frequent obstruction of the guide reeds by the wrapper when the latter is even slightly faulty or folded.

[0007] The same is true of the frequent malfunctions of the sealing device resistors, as they are subject to failure due to the motion in two directions.

[0008] Lastly, lack of positioning of the sticks in the initial product supply is also a factor which limits production of lollipops, and even when its incidence on production is minimal or non-existent, it must be pointed out that the lack of a suitable rejection system greatly affects the quality of the supply system, or requires a costly manual selection.

[0009] The applicant is unaware of any lollipop wrapping machines which are provided with the innovations presented in the memory which is hereunder described.

DESCRIPTION OF THE INVENTION

[0010] The invention of the present memory relates to a lollipop wrapping machine, from among those machines provided with means for aligning the lollipops, for supply and application of the wrappers and sealing them on themselves and to the lollipop stick.

[0011] The invention is characterised by incorporat-

ing a number of devices which are hereunder described, based on a lollipop positioning system before their continuous supply to the wrapping area, which consists of a pusher, whether pneumatic, electronic or mechanical, which performs the fine positioning of the lollipop end.

[0012] To this end the supply disc is provided with ample peripheral recesses, considerably larger than the lollipop, which receive said lollipop upon impact and transport of the radial rod and regardless of its size, so that exchanging the disc or locking on the suitable dimensions of the same disc is prevented, in order to adapt its recesses to the size of the lollipop to be wrapped, with the ensuing time saved in exchanging runs, as well as preventing obstruction resulting from an incorrect locking of the lollipop or from its faulty size.

[0013] For this purpose, this fine positioning is placed externally to the disc, after the ramp which rises towards the lollipop supply belt by the pusher, frontally and quickly adjustable depending on the format chosen, which precisely and to a preset measure positions the lollipop with respect to the precise point in which it shall tangentially receive the wrapper in the axial projection of the stick on the free end of the lollipop.

[0014] It is thus sufficient to synchronise the pusher with the working pace of the machine to solve all problems related to lateral obstructions by virtue of this forward push provided by the pusher device.

[0015] Furthermore, it is provided with a system for unwinding, cutting and supplying the wrappers which minimises the distance between the supplier rollers and the cutting blades. This construction allows to considerably increase the speed of supply of individual wrappers, without producing obstructions.

[0016] As it lacks cams and other devices which require a laborious assembly in the event of malfunctions, this system is both easy to assemble and to adjust.

[0017] It is further provided with progressive ramps for acceleration and deceleration, which prevent the transmission of sudden stresses to the film and which allow the action of the servomotor which drives the film supplying rollers, by virtue of the correction instructions of the mark placed on the wrapper material, made with great precision by the mark sensor photocell.

[0018] The blade is rotary for a continuous cut, as well as the supply mechanism, which stops only when lacking wrapping material. In this event, both starts and stops are gentle and almost imperceptible, due to the disposition of sine ramps which cover almost 40% of the wrapper, so that the wrapper shall be perfectly centred when positioned opposite the lollipop.

[0019] The diameter of the drag roller is set fully independent of the correct supply of wrappers, so that it is not affected by natural operational wear, also not affecting the cutting and positioning of the wrappers.

[0020] An alarm system warns of a faulty photocell or when the mark insertion band is not opposite the cell.

The machine may also stop when the wrappers obstruct the supply system, by the arrangement of independent servomotors which control the entire system, acting on the paper drag shaft and on the blade shaft.

[0021] Both synchronise the system with the rest of the machine's systems, which may be separated from the unit temporarily when required to adjust specific mechanisms.

[0022] The set is completed by a network provided in the electrical board through which are integrally communicated the shaft control, the PLC and the operator tactile terminal.

[0023] The wrapper supplying system is mainly characterised in that it eliminates the continual and frequent obstructions of the guide reeds by the wrappers, by incorporating on one side, instead of these reeds, a part designed with a given roughness opposite which is placed the nozzle of a conventional ionisation device, together with a pressurised air blower, with the blown air positively ionised in order to neutralise the negative electrostatic charge of the wrapper, while keeping the wrapper fully flat and vertical, as well as aiding in its transportation.

[0024] This construction has the further advantage of allowing an unobstructed passage of the adhesive tape which connects the end of a wrapper film reel with the start of the following one, as guide reeds which would inevitably catch this connection are not present.

[0025] A further novel system is the sealing of wrappers by using hot air, once the lollipop has been wrapped conventionally, with the known folds accumulated on the upper stick segment.

[0026] This sealing is fully static in order to prevent the constant breaking of conventional ones and replaces the known bi-directional moving electrical resistors by a suitable configuration of the blower nozzle of a conventional hot air generator, which is arranged as a transverse half-moon section.

[0027] The hot air is made to pass through the slit sealing clips, allowing a direct incidence of the air on the wrapper, with intensity controlled externally by the heating units, so that the wrapper already closed on the lollipop is sealed.

[0028] The balance of hot air pressures in the area is achieved by applying a conventional extractor, which prevents the appearance of air pockets and which is provided with a plate or grille to deflect rejected or fallen wrappers, both at the start of sealing or at the end runs, thus preventing the obstruction of this extraction system.

[0029] A further system incorporated is rejection of incorrectly wrapped lollipops, fully automated and adjustable as regards acceptance by the packager user to a preset manufacturing standard, so that it may define and control the product to be rejected at will.

[0030] For example, this factor applies to the positioning of the manufacturer's brand mark on the spherical cap of the lollipop in the internal axial extension of

the stick, so that a deviation by a given number of mm from the central area of the wrapper closed on this lollipop is considered a rejection. It should be remembered that these deviations are not only aesthetic and commercial in value but also affects the quality of the sealing of the lollipop on the opposite end, that is on the stick end.

[0031] For this purpose a pneumatic actuator is provided, in order to deflect rejections to a different chute off the wrapping line, so that when acting following the directions of an automat, an end pusher advances which covers the main duct obliquely in a bifurcation area or which allows a flap to descend as the lollipop to be rejected passes which is then raised again, closing the end of the supply duct from the wrapping line.

[0032] The procedure followed by the system consists of analysing the separation between the wrapper mark and the relative position of the encoder, determining by this the positional error in real time, so that the error detected is compared to that preset by the wrapper and depending on its extent each part is rejected or not.

[0033] The final system consists of the automatic reel change, so that the machine reduces the speed by a conventional detection of the proximity of the end of a wrapper reel, such as by a conventional sensor, and proceeds to conventionally stick the initial end of the new reel, for example using adhesive tape, as well as to cut the remainder of the first reel, which also passes without trouble through the supply system.

[0034] Finally, the machine is provided with means for automatic control of its operation by the user and further remote controls by a modem.

DESCRIPTION OF THE DRAWINGS

[0035] These and further advantages of the invention will become apparent in view of the following description made with reference to the accompanying drawings, where, for purposes of illustration and in a non limiting sense the following is shown:

Figure 1 shows a plan schematic view of the conventional distribution and alignment means for lollipops to which the positioning system of the invention applies.

Figure 2 is a perspective detail of this positioning system.

Figure 3 shows a schematic perspective view of the dragging and cutting servomechanisms of the continuous wrapper film, as well as the mark detection means and unitary cutting means of the wrappers.

Figure 4 shows a schematic perspective representation of the lollipop wrapper supply devices.

Figure 5 shows two views of the sealing method of the wrapper to the lollipop, the top one in a plan view and the lower one in an elevation view, both schematically.

Figure 6 is the defectively wrapped lollipop rejection system, in the two positions described in the example of the preferred embodiment.

Figure 7 is the arrangement of the automatic wrapper reel changing device, with the means for connection of the codas to the head of the film when replacing one by another.

PREFERRED EMBODIMENT OF THE INVENTION

[0036] In view of the above, the present invention relates to a lollipop wrapping machine, from among machines with means for aligning the lollipops, means for supplying and applying the wrappers and means for sealing them, essentially characterised in that it incorporates a positioning system (1) for lollipops, prior to their constant supply to the wrapping area, consisting of a pusher, whether pneumatic, electronic or mechanical, which performs the fine adjustment of the lollipop end; it is further provided with an unwinding, supply and cutting system of wrappers (2) provided with means and devices for dragging the wrappers; as well as a further supply system (3) of wrappers by a curtain of ionised air; a sealing system (4) of the wrappers to the lollipop stick using hot air; means for controlling the hot air pressure and deflectors for rejected wrappers (5); a rejection system (6) for incorrectly wrapped lollipops and an automatic reel changing system (7).

[0037] For this purpose supply disc (1.1) of the positioning system (1) is provided with ample recesses (1.1.1) which may receive any size of lollipops (8), which once positioned on supply belt (1.2) place lollipop (8) at the preset location using front pusher (1.3.1) of cylinder (1.3), with pusher (1.3.1) synchronised with the machine's working pace.

[0038] The unwinding, cutting and supply system (2) of wrappers is provided with sinusoidal progressive acceleration and deceleration ramps which cover almost 40% of the wrapper centre, with a servomotor (2.1) for driving rollers (2.2) which supply film (9), by virtue of precise correction instructions for mark (9.1) of wrapper (9.2) using the photocell of mark sensor (2.3) connected to an alarm system in the event of a faulty photocell or of a misalignment of the mark insertion band, as well as a further independent servomotor (2.4) for driving roller (2.5) of rotary blade (2.5.1), with rollers (2.2) independent of the correct supply of wrappers (9.2), with servomotors (2.1) and (2.4) synchronising the system (2) with the remaining systems of the machine, and temporarily detachable from system (2) for adjustment of specific mechanisms, this system (2) completed by a network provided in the electrical board

through which are integrally communicated the shaft control, the PLC and the operator tactile terminal.

[0039] The wrapper supplying system (3) is characterised in that it incorporates a part (3.1) designed with a given roughness opposite which is placed the nozzle of an ionisation device (3.2), together with a positively ionised pressurised air (3.3) blown in order to neutralise the negative electrostatic charge of wrapper (9.2), while keeping the wrapper fully flat and vertical, as well as aiding in its transportation.

[0040] This static sealing of wrappers (4) by hot air once the lollipop is wrapped by a suitable configuration of the blower nozzle (4.1) of a hot air (4.3) generator (4.2), which is arranged as a transverse half-moon section, with hot air (4.3) passing through the slit sealing clips (4.4).

[0041] The balance of pressures of hot air (4.3) in the area is achieved by a conventional air extractor (5), which is provided with a deflection grille (5.1) for rejected or fallen wrappers (9.2).

[0042] The rejection system (6) for incorrectly wrapped lollipops (9.3), which is automatic and adjustable at will by the product manufacturer by deviation of the position of central area (9.4) of the wrapper with respect to the lollipop by a pneumatic, electric or mechanical actuator (6.1) which deflects incorrectly wrapped lollipops (9.3) to a bifurcation (6.2) of the wrapping line (6.1), according to the instructions received from an automat, analyses the separation between the wrapper mark (9.1) and the relative position of the encoder, determining the positional errors in real time and by means of a pusher (6.1.1) which moves obliquely, closes the wrapping line (6.1) or allows a flap to fall as the incorrectly wrapped lollipop (9.1) passes blocking the line after it passes.

[0043] The automatic reel changing system (7) acts after a speed reduction by detection using a sensor of the reel end, attaching the start (7.1.1) of new reel (7.1) using adhesive tape (7.3) to the end (7.2.1) of first reel (7.2) as well as cutting remainder (7.2.1).

[0044] Finally, the machine is provided with means for remote control of its operation by a modem, both for the servomotor controls using a PLC automat and of the tactile terminal placed on the monitor for the operator's use, provided with a bifurcation terminal to three elementary antennae.

[0045] The description is not taken further in the understanding that any expert in the field would have sufficient information to understand the scope of the invention and the advantages derived thereof, as well as to reproduce it.

[0046] It is understood that, as long as the essence of the invention remains unaltered, variations in the materials, shape, size and arrangement of the elements are subject to changes within the same characterisation.

[0047] Terms used in the description as well as its meaning are to be considered always as non-limiting.

Claims

1. Lollipop wrapping machine, from among machines with means for aligning the lollipops, means for supplying and applying the wrappers and means for sealing them, essentially characterised in that it incorporates:
 - a positioning system (1) for lollipops, prior to their constant supply to the wrapping area, consisting of a pusher, whether pneumatic, electronic or mechanical, which performs the fine adjustment of the lollipop end;
 - An unwinding, supply and cutting system of wrappers (2) provided with means and devices for dragging the wrappers;
 - A supply system (3) of wrappers by a curtain of ionised air;
 - A sealing system (4) of the wrappers to the lollipop stick using hot air;
 - Means for controlling the hot air pressure and deflectors for rejected wrappers (5);
 - A rejection system (6) for incorrectly wrapped lollipops and an automatic reel changing system (7);
 - Means for remote control of its operation by a modem, both of the servomotor controls using a PLC automat and of the tactile terminal placed on the monitor for the operator's use, provided with a bifurcation terminal to three elementary antennae..
2. Lollipop wrapping machine, as claimed in above claim, provided with a supply disc (1.1), characterised in that the positioning system (1.1) incorporates a disc (1.1) provided with ample recesses (1.1.1) which may receive any size of lollipops (8), which once positioned on supply belt (1.2) place lollipop (8) at the preset location using front pusher (1.3.1) of cylinder (1.3), with pusher (1.3.1) synchronised with the machine's working pace.
3. Lollipop wrapping machine as claimed in claim 1, characterised in that the unwinding, cutting and supply system (2) of wrappers is provided with sinusoidal progressive acceleration and deceleration ramps which cover almost 40% of the wrapper centre, with a servomotor (2.1) for driving rollers (2.2) which supply film (9), by virtue of precise correction instructions for mark (9.1) of wrapper (9.2) using the photocell of mark sensor (2.3) connected to an alarm system in the event of a faulty photocell or of a misalignment of the mark insertion band, as well as a further independent servomotor (2.4) for driving roller (2.5) of rotary blade (2.5.1), with rollers independent of the correct supply of wrappers (9.2), with servomotors (2.1) and (2.4) synchronising the system (2) with the remaining systems of the machine, and temporarily detachable from system (2) for adjustment of specific mechanisms, this system (2) completed by a network provided in the electrical board through which are integrally communicated the shaft control, the PLC and the operator tactile terminal.
4. Lollipop wrapping machine as claimed in claim 1, characterised in that wrapper supplying system (3) is characterised by incorporating a part (3.1) designed with a given roughness opposite which is placed the nozzle of an ionisation device (3.2), together with blown positively ionised pressurised air (3.3), in order to neutralise the negative electrostatic charge of wrapper (9.2), while keeping the wrapper fully flat and vertical, as well as aiding in its transportation.
5. Lollipop wrapping machine as claimed in claim 1, characterised in that, once the lollipop is sealed, said static sealing system (4) of wrappers uses hot air with a suitable configuration of the blower nozzle (4.1) of a hot air (4.3) generator (4.2), which is arranged as a transverse half-moon section, with hot air (4.3) passing through the slit sealing clips (4.4).
6. Lollipop wrapping machine as claimed in claim 1, characterised in that the balance of pressures of hot air (4.3) in the area is achieved by an air extractor system (5), which is provided with a deflection grille (5.1) for rejected or fallen wrappers (9.2).
7. Lollipop wrapping machine as claimed in claim 1, characterised in that the rejection system (6) for incorrectly wrapped lollipops (9.3), automatic and adjustable at will by the product manufacturer, by deviation of the position of central area (9.4) of the wrapper with respect to the lollipop by a pneumatic, electric or mechanical actuator (6.1) which deflects incorrectly wrapped lollipops (9.3) to a bifurcation (6.2) of the wrapping line (6.1), according to the instructions received from an automat, analyses the separation between the wrapper mark (9.1) and the relative position of the encoder, determining the positional errors in real time, and by means of a pusher (6.1.1) which moves obliquely closes the wrapping line (6.1) or allows a flap to fall as the incorrectly wrapped lollipop (9.3) passes blocking the line after it passes.
8. Lollipop wrapping machine as claimed in claim 1, characterised in that the automatic reel changing system (7) acts, after a speed reduction, by detection with a sensor of the reel end, attaching the start (7.1.1) of new reel (7.1) with adhesive tape (7.3) to the end (7.2.1) of first reel (7.2) as well as cutting remainder (7.2.1).

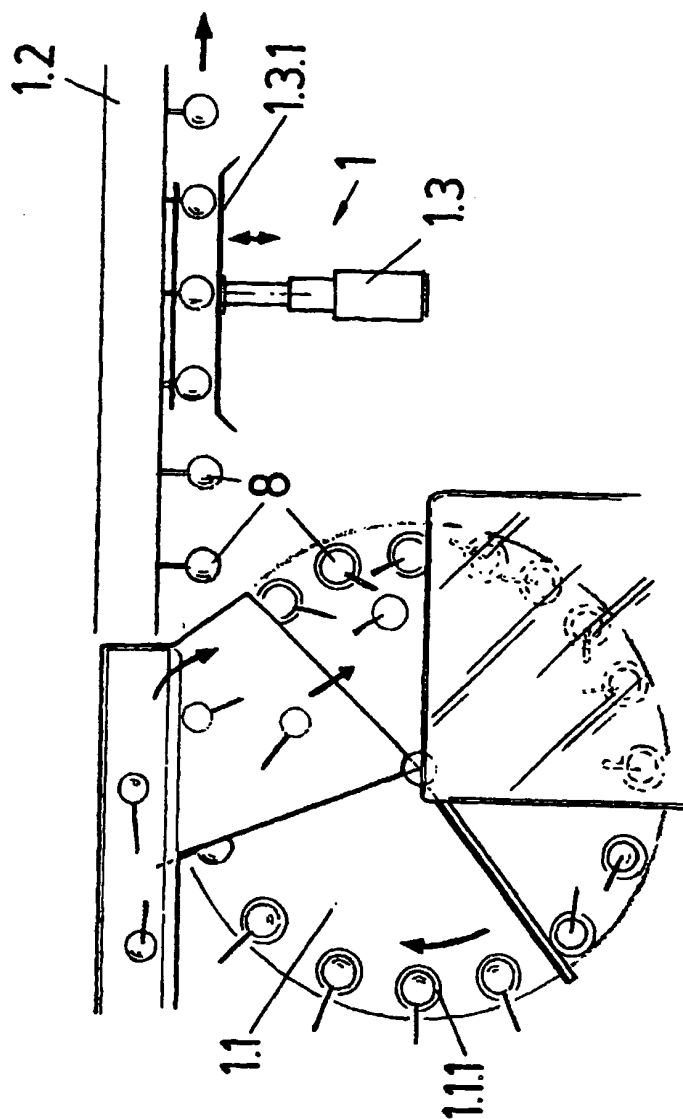


FIG. 1

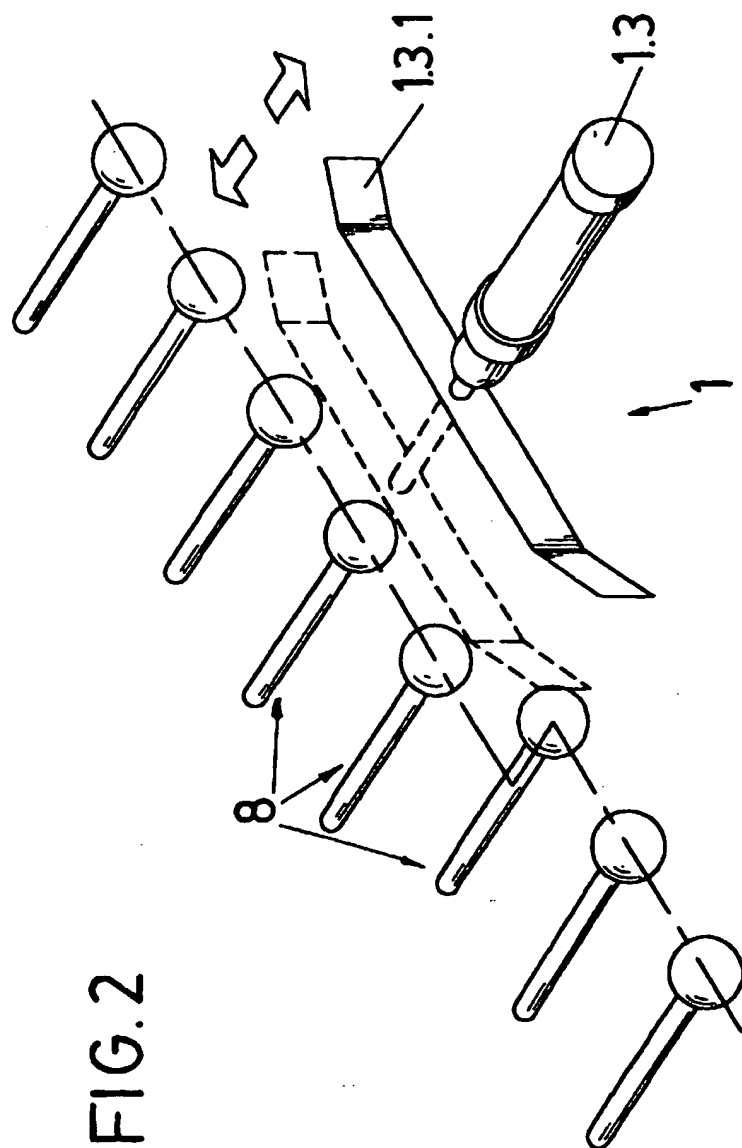
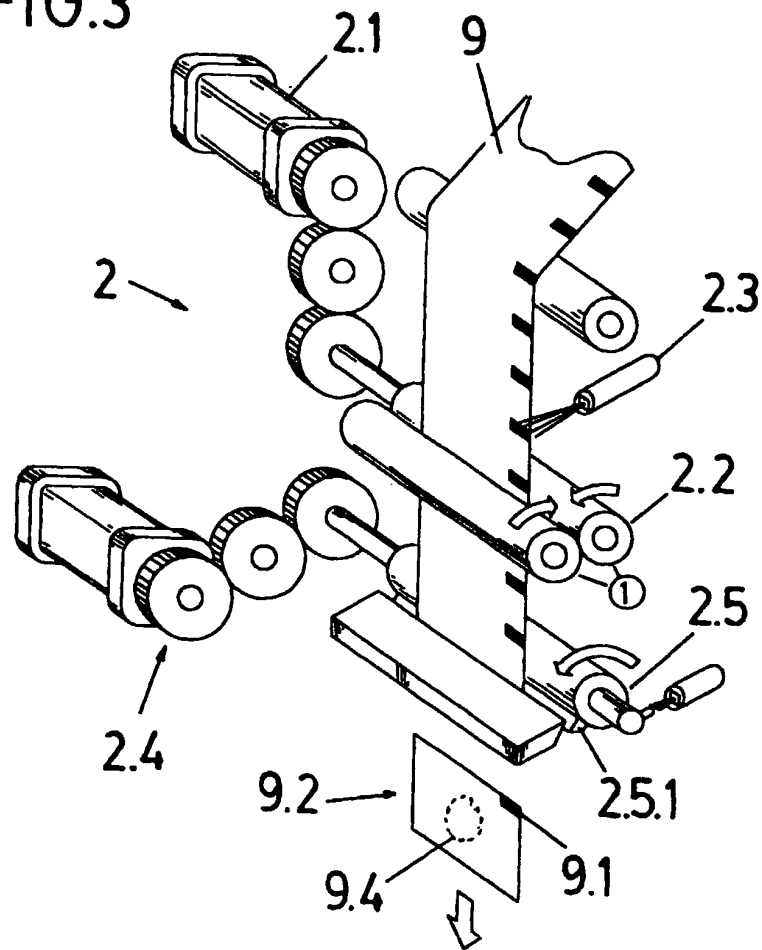
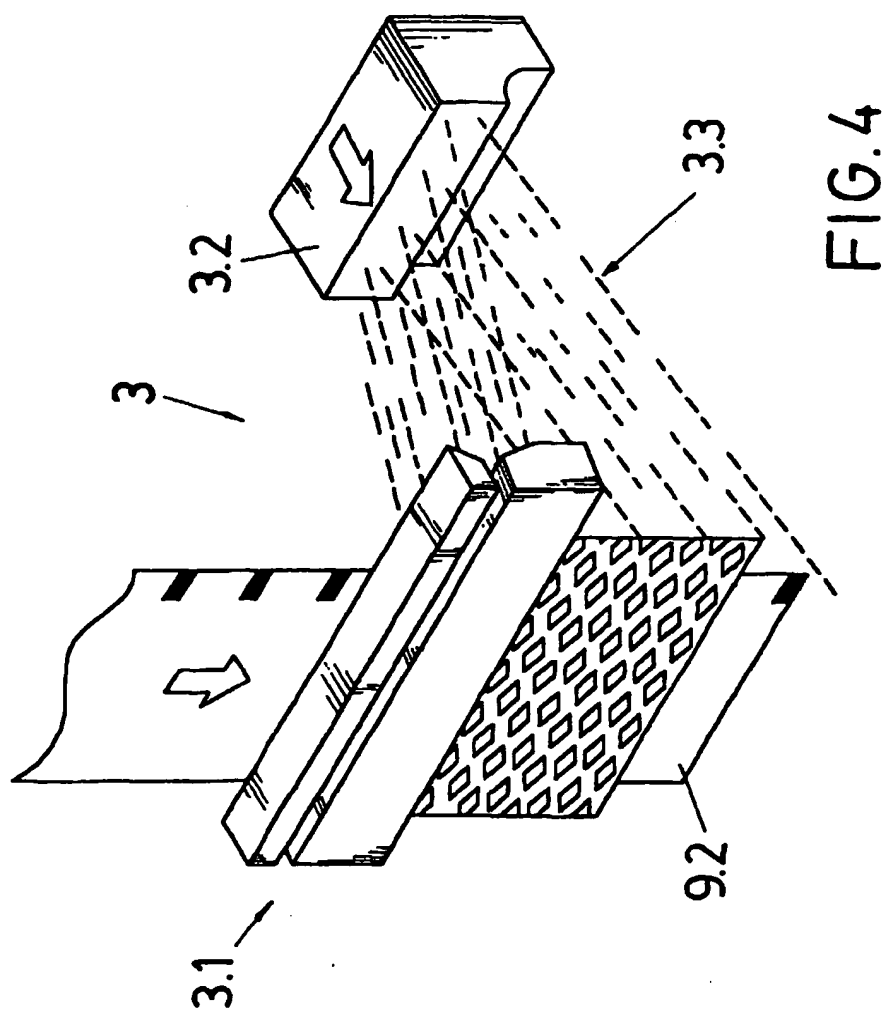
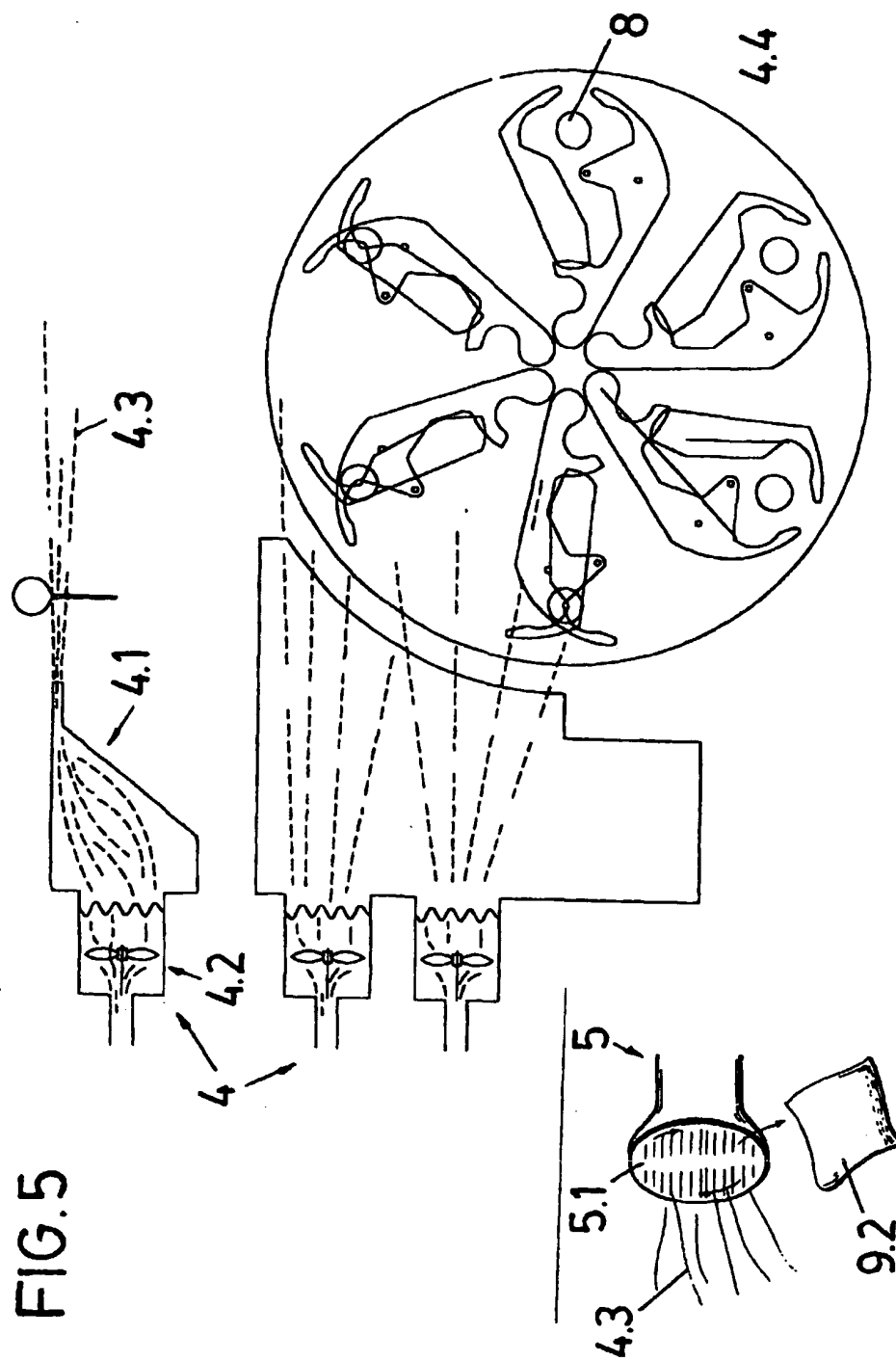


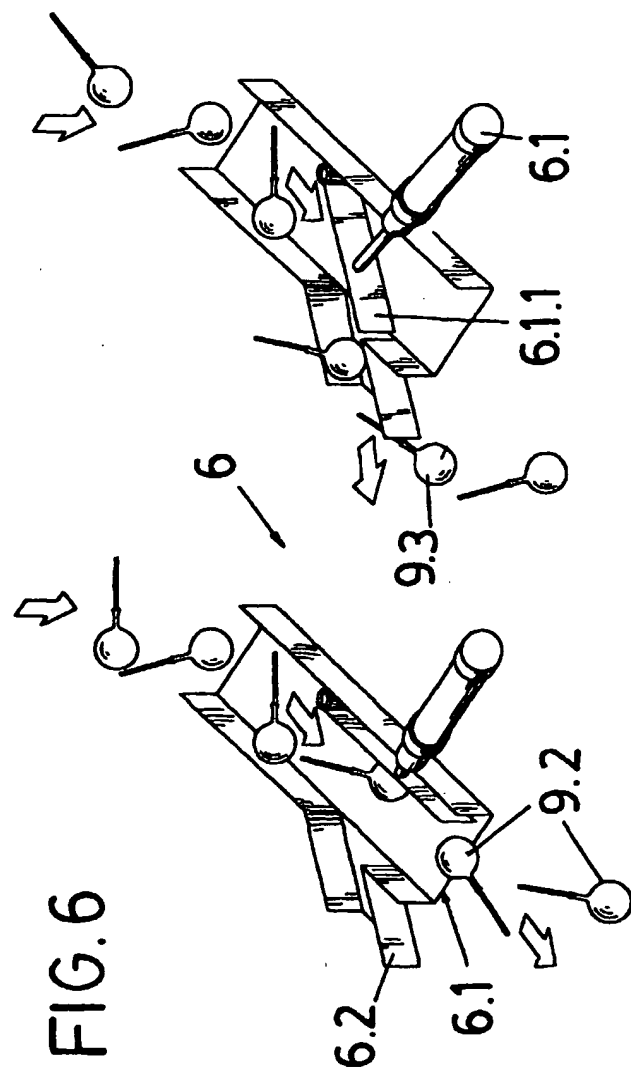
FIG. 2

FIG.3









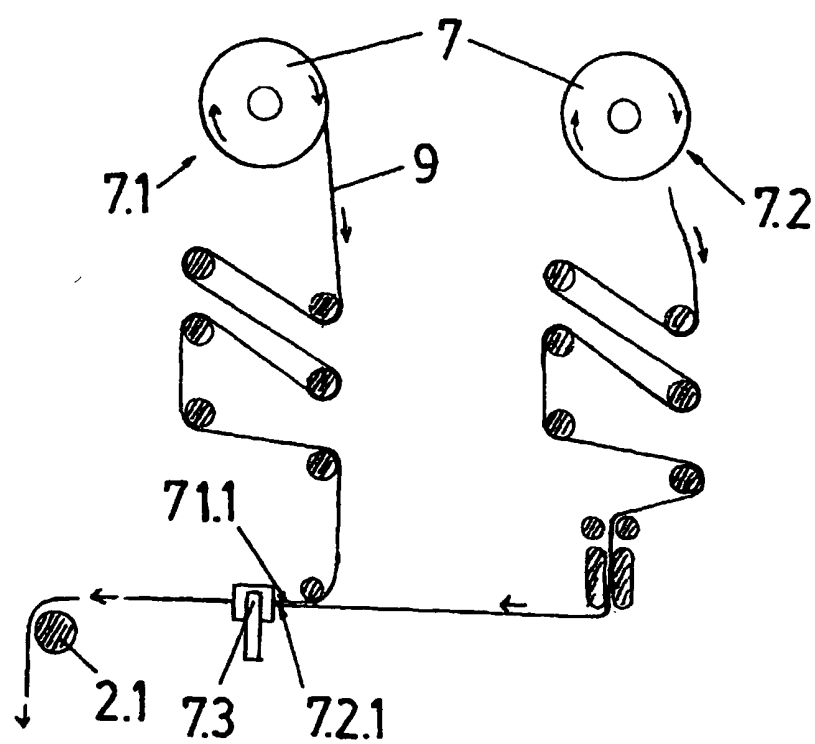


FIG.7

INTERNATIONAL SEARCH REPORT

Intern. Appl. No.

PCT/ES 98/00281

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65B11/54 B65G47/244

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B65B B65G A23G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 450 706 A (LATINI LEO) 19 September 1995 see column 2, line 67 - column 3, line 6 see column 3, line 31 - line 44 see column 3, line 53 - line 68 see column 6, line 39 - line 43 ---	1
A	EP 0 036 282 A (PARLOUR & BLACK (HOLDINGS) LTD) 23 September 1981 see abstract; figures 10,13 ---	1
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A	US 4 024 058 A (DERCKX HENRICUS ANTONIUS JACOB) 17 May 1977 ---	
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Date of the actual completion of the international search

16 June 1999

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INTERNATIONAL SEARCH REPORT

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		International Application No. PCT/ES 98/00281
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 285 199 A (STAMP ET AL) 15 November 1966 -----	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/ES 98/00281

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